

WHAT IS CLAIMED IS:

- 1           1.       A multichannel electronic-ignition control device, comprising:  
2                   a plurality of driving stages, one for each channel, and each having a high-voltage  
3 terminal to drive an inductive load; and  
4                   a control circuit, connected to each of the driving stages, including a  
5 corresponding plurality of control stages that are integrated in a single semiconductor body and  
6 each connected to the high-voltage terminal of a respective one of the driving stages.
- 1           2.       The device according to Claim 1, wherein the control stages are high-voltage  
2 stages.
- 1           3.       The device according to Claim 1 wherein the control circuit comprises a  
2 decoupling circuit that decouples the high-voltage terminals of the driving stages from one  
3 another.
- 1           4.       The device according to Claim 3, wherein the decoupling circuit comprises a  
2 plurality of diodes, each having an anode terminal connected to the high-voltage terminal of a  
3 respective driving stage and a cathode terminal connected to a substrate of said semiconductor  
4 body.

1           5.     The device according to Claim 1, wherein the control circuit comprises a  
2     discharge-sensing circuit, having a plurality of inputs each connected to corresponding high-  
3     voltage terminals of the driving stages, and an output generating a recognition pulse whenever an  
4     operating voltage on one of the high-voltage terminals exceeds a predetermined threshold  
5     voltage.

1           6.     The device according to Claim 5, wherein the discharge-sensing circuit comprises  
2     a comparator having at least one first input connected to said high-voltage terminals and a  
3     second input connected to the threshold voltage.

1           7.     The device according to Claim 5, further including a logic circuit to selectively  
2     and sequentially actuate each control stage, and thus its associated driving stage, to drive the  
3     connected inductive load wherein the recognition pulses are received by the logic circuit.

1           8.     The device according to Claim 1, wherein each driving stage comprises a power  
2     transistor having a control terminal and further having a conduction terminal forming the high-  
3     voltage terminal.

1           9.     The device according to Claim 8, wherein each control stage comprises a resistive  
2     damping element connected between the control and conduction terminals of the power  
3     transistors (11).

1           10.    The device according to Claim 9, wherein the resistive damping element is non-  
2 linear.

1           11.    The device according to Claim 1, wherein each control stage comprises a low-  
2 voltage clamp circuit connected to its corresponding driving stage for limiting the operating  
3 voltage in predetermined operating conditions.

1           12.    The device according to Claim 11, wherein the low-voltage clamp circuit is  
2 selectively activatable in the predetermined operating conditions.

1           13.    An apparatus for electronic ignition comprising:  
2                   a battery supplying a supply voltage;  
3                   a plurality of transformers, each having primary and secondary windings  
4 connected to the battery;  
5                   an ignition-control circuit also connected to the battery and having a plurality of  
6 driving stages, one for each transformer, each driving stage having an output coupled to the  
7 primary winding of the corresponding transformer, and further having a corresponding plurality  
8 of control stages, one for each driving stage, which are integrated on a single semiconductor  
9 body.

1           14.    The apparatus according to Claim 13, wherein each driving stage includes a high  
2 voltage terminal connected to the primary winding of the corresponding transformer.

1           15.    The apparatus according to Claim 13, further comprising a logic control unit to  
2 selectively and sequentially actuate each control stage, and thus its associated driving stage, to  
3 drive the connected primary winding of the corresponding transformed.

1           16.    The apparatus according to Claim 15, further comprising a detection circuit to  
2 detect driving of any of the connected primary windings and output a recognition pulse in  
3 response thereto, and wherein the recognition pulses are sensed by the logic control circuit.

1           17.    A multichannel inductive load control device, comprising:  
2                   a plurality of driving stages, one for each of a plurality of inductive load channels,  
3   and each having a high-voltage terminal to drive its associated inductive load;  
4                   a control circuit, including:  
5                   a plurality of control stages, one for each driving stage, each control stage  
6   including a control terminal and an actuation terminal, the actuation terminal connected to cause  
7   actuation of the associated driving stage to drive the inductive load; and  
8                   a sensor circuit connected to each inductive load and operable to detect  
9   successful driving of any one of the inductive loads and output a detection signal indicative  
10 thereof; and  
11                  a logic circuit connected to the control terminals of the control stages to  
12 individually control actuation of the associated driving stage and receive the detection signal  
13 from the sensor circuit in response to detected successful driving of the inductive loads.

1           18.    The device of claim 17 wherein the plurality of control circuits are fabricated on a  
2   single integrated circuit.

1           19.    The device of claim 18 further including a decoupling circuit to decouple the  
2   plurality of control circuits from each other.

1           20.    The device of claim 17 wherein the sensor circuit comprises a voltage comparison  
2   device that compares a voltage on any of the high voltage terminals to a threshold, the detection  
3   signal being generated when the voltage exceeds the threshold.

1           21.    An inductive load control device, comprising:  
2                   a high voltage power transistor including a first conduction terminal to drive an  
3 inductive load, the power transistor further including a control terminal;  
4                   a control stage having a control input receiving an activation signal and an output  
5 connected to the control terminal of the power transistor to control selective driving of the  
6 inductive load; and  
7                   a sensor circuit connected to the first conduction terminal of the high voltage  
8 power transistor and operable to detect successful driving of the inductive load.

1           22.    The device of claim 21 further including a diode connected between the first  
2 conduction terminal of the high voltage power transistor and the sensor circuit.

1           23.    The device of claim 21 wherein the control stage includes a dampening circuit  
2 connected between the first conduction terminal and control terminal of the high voltage power  
3 transistor.

1           24.    The device of claim 23 wherein the dampening circuit comprises a resistive  
2 dampening element.

1           25.    The device of claim 24 wherein the resistive dampening element comprises a non-  
2 linear resistor.

1           26.    The device of claim 21 wherein the control stage includes a current limiting  
2 circuit connected between the first conduction terminal and control terminal of the high voltage  
3 power transistor.

1           27.    The device of claim 21 further including a logic circuit connected to the control  
2 input of the control stage to selectively control actuation of the connected driving stage and  
3 receive a detection signal from the sensor circuit indicative of detected successful driving of the  
4 inductive load.

1           28.    The device of claim 21 wherein the inductive load is a primary coil of a voltage  
2 step up transformer.

1           29.    The device of claim 21 wherein the sensor circuit comprises a voltage comparison  
2 device that compares a voltage on the first conduction terminal of the high voltage power  
3 transistor to a threshold and generates a detection signal when the voltage exceeds the threshold.